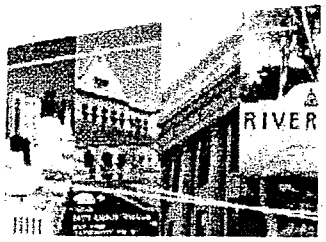

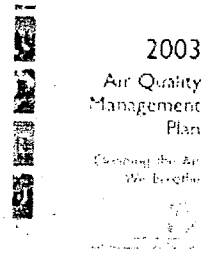

2003 Air Quality Management Plan

Clean Air Plans Home
Air Quality Management Plans
Coachella Valley PM10 Plans
Air Toxics Control Plan
Socioeconomic Home
CEQA Home

The South Coast Air Quality Management District Governing Board adopted the 2003 Air Quality Management Plan (AQMP) on August 1, 2003. The 2003 AQMP updates the attainment demonstration for the federal standards for ozone and particulate matter (PM10); replaces the 1997 attainment demonstration for the federal carbon monoxide (CO) standard and provides a basis for a maintenance plan for CO for the future; and updates the maintenance plan for the federal nitrogen dioxide (NO_2) standard that the South Coast Air Basin (Basin) has met since 1992.

This revision to the AQMP also addresses several state and federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes and new air quality modeling tools. The 2003 AQMP is consistent with and builds upon the approaches taken in the 1997 AQMP and the 1999 Amendments to the Ozone SIP for the South Coast Air Basin for the attainment of the federal ozone air quality standard. However, this revision points to the urgent need for additional emission reductions (beyond those incorporated in the 1997/99 Plan) from all sources, specifically those under the jurisdiction of the California Air Resources Board and the U.S. Environmental Protection Agency which account for approximately 80 percent of the ozone precursor emissions in the Basin.

For information about the 2003 AQMP, contact Joe Cassmassi

Format of This Document

This document is organized into ten chapters, each addressing a specific topic. Each of the chapters are summarized below.

Each document (Chapter or Appendix) is a separate PDF file. The size of the file is shown next to each link. *Some of the documents are very large (greater than 1mb)* If you do not have Acrobat Reader, you can download it free by clicking the icon below.

Get Adobe Reader

Table of Contents *(91 Kb)*

Note: The Table of Contents shows the contents of each chapter, but is not hyperlinked

Executive Summary *(243 Kb)*

Chapters

1 Introduction *(280 Kb)*

2 Air Quality and Health Effects

Chapter 2, "Air Quality and Health Effects," discusses the Basin's air quality in comparison with the federal and state air pollution standards and presents summary information on health effects of various pollutants.

3 Base Year and Future Emissions

Chapter 3, "Base Year and Future Emissions," summarizes recent updates to the emissions inventories, estimates current emissions by source and pollutant, and projects future emissions with and without controls.

4 AQMP Control Strategy

Chapter 4, "AQMP Control Strategy," presents the attainment strategies.

5 Future Air Quality

Chapter 5, "Future Air Quality," describes the modeling approach used in the AQMP and summarizes the Basin's future air quality projections with and without controls.

6 Clean Air Act Requirements

Chapter 6, "Clean Air Act Requirements," discusses specific federal and state requirements as they pertain to the 2003 AQMP and demonstrates compliance with the requirements.

7 Implementation

Chapter 7, "Implementation," presents the implementation schedule of the various control measures and delineates each agency's area of responsibility.

8 Future Air Quality - Desert Nonattainment Area

Chapter 8, "Future Air Quality - Desert Nonattainment Areas," demonstrates compliance with the Federal Clean Air Act requirements pertaining to the Coachella Valley.

9 Contingency Measures

Chapter 9, "Contingency Measures," presents contingency measures as required by the federal CAA .

10 Looking Beyond Current Requirements

Chapter 10, "Looking Beyond Current Requirements", discusses uncertainties associated with the technical analysis provided in the AQMP; and presents a preliminary analysis regarding the new Federal $PM_{2.5}$ and 8-hour ozone ambient air quality standards.

Glossary

Appendices

I Health Effects *(228 Kb)*

II Current Air Quality *(1.3 Mb)*

III **Base and Future Year Emission Inventories**

Appendix III main document *(509 kb)*

Attachment A,
Annual Average Emissions by Major Source Category *(160 kb)*
Attachment B,
Summer Planning Emissions by Major Source Category *(144 kb)*
Attachment C,
Winter Planning Emissions by Major Source Category *(132 kb)*
Attachment D,
Top 300 SCAB VOC and NOX Producers in 1997 *(93 kb)*
Attachment E,
On-Road Emissions by Vehicle Category *(102 Kb)*
Attachment F,
Emissions from Diesel Fuel, by Major Source Category *(70 Kb)*

IV-A District's Stationary and Mobile Source Control Measures,

IV-B **Proposed State and Federal Strategy for the California State Implementation Plan**
http://www.arb.ca.gov/planning/sip/stfed03/stfed03.htm
Note: this link will take you to the California Air Resources Board (CARB) website

IV-C Regional Transportation Strategy and Control Measures

V **Modeling and Attainment Demonstrations**
Appendix V main document *(3.9 Mb)*
Appendix A to Appendix V , UAM Base Year Model Performance Statistics and Graphical Evaluation *(5.6 Mb)* .
Attachments 1-6 *(600 Kb)*
(Modeling Protocol, Expert Panel Modeling Critiques, Mid-Course Modeling Reviews, CEPA Source Level Emissions Reduction Summaries for 2006 & 2010, including annual and planning inventories)
Attachment 7CalGrid Ozone Simulation *(983 Kb)*

Other Important AQMP Documents

- Responses to Comments on the Draft 2003 Air Quality Management Plan
- Additional Comments and Responses
- Final Program Environmental Impact Report

Socioeconomic Report:

- Socioeconomic Report main document *(1.6 Mb)*
  (Table of Contents, Chapters 1-8)
- Appendices A-D *(505 Kb)*
  (Assessment Methodology, The REMI Model, Adjustment of the REMI control Forecast, Glossary)
- Appendix E *(1.9 Mb)*
  (Responses to Comments)

This page updated: December 29, 2005
URL: http://www.aqmd.gov/aqmp/AQMD03AQMP.htm

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EXECUTIVE SUMMARY

INTRODUCTION

The air we Southern Californians breathe continues to get cleaner, with recent years registering as the cleanest in decades. The remarkable improvement in air quality is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its Air Quality Management Plan (AQMP). Yet the air in Southern California is far from meeting all federal and state air quality standards and, in fact, is among the worst in the nation. To reach the clean air goal in the few years remaining until Clean Air Act deadlines, Southern California must not only continue its diligence but intensify its pollution reduction efforts.

Continuing the progress toward clean air is a challenging task, not only to recognize and understand complex interactions between emissions and resulting air quality, but also to pursue the most effective possible set of strategies to improve air quality while maintaining a healthy economy. To ensure continued progress toward clean air and comply with state and federal requirements, the South Coast Air Quality Management District (AQMD or District) in conjunction with the California Air Resources Board (CARB), the Southern California Association of Governments (SCAG) and the U.S. Environmental Protection Agency (U.S. EPA) is preparing the 2003 revision to its AQMP (2003 AQMP or 2003 Plan). The 2003 AQMP employs up-to-date science and analytical tools and incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, on-road and off-road mobile sources and area sources.

The 2003 AQMP updates the demonstration of attainment with the federal standards for ozone and PM10; replaces the 1997 attainment demonstration for the federal carbon monoxide (CO) standard and provides a basis for a maintenance plan for CO for the future; and updates the maintenance plan for the federal nitrogen dioxide (NO_2) standard that the South Coast Air Basin (Basin) has met since 1992.

The 2003 AQMP proposes policies and measures to achieve federal and state standards for healthful air quality in the Basin and those portions of the Salton Sea Air Basin (formerly named the Southeast Desert Air Basin) that are under District jurisdiction (namely, Coachella Valley). The Coachella Valley PM10 Plan was recently revised in June 2002 and forwarded to CARB and U.S. EPA for approval.

This revision to the Plan also addresses several state and federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes and new air quality modeling tools. This Plan is consistent with and builds upon the approaches taken in the 1997 AQMP and the 1999 Amendments to the Ozone SIP for the South Coast Air Basin for the attainment of the federal ozone air quality standard. However, this revision points to the urgent need for additional emission reductions (beyond those incorporated in the 1997/99 Plan) to offset increased emission estimates from mobile sources and meet all

federal criteria pollutant standards within the time frames allowed under the federal Clean Air Act.

This Plan as well as other key supporting information is available electronically and can be downloaded from the District's home page on the Internet (http://www.aqmd.gov and click on "Clean Air Plans").

WHY IS THIS PLAN BEING PREPARED?

The California Clean Air Act requires a non-attainment area to update its AQMP triennially to incorporate the most recent available technical information. In addition, U.S. EPA requires that transportation conformity budgets be established based on the most recent planning assumptions (i.e., within the last 5 years). Both the 1997 SIP and the 1999 amendments were based on demographic forecasts of the mid-1990's using 1993 as the base year. Since then, updated demographic data has become available, new air quality episodes have been identified, and the science for estimating motor vehicle emissions and air quality modeling techniques for ozone and PM10 have improved. Therefore, a plan update is necessary to ensure continued progress toward attainment and to avoid a transportation conformity lapse and associated federal funding losses.

On June 2, 2003, EPA published in the Federal Register its "Proposed Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard," 68 Fed.Reg. 32801-32870. As part of that proposal, EPA solicits comment on a proposal to revoke the present 1-hour ozone standard either in whole or in part one year after EPA designates the 8-hour ozone nonattainment areas. (68 Fed.Reg. 32019.) It is expected that EPA will designate the 8-hour ozone nonattainment areas by April 15, 2004. (68 Fed.Reg. 32808.) EPA is extremely unlikely to finalize this rule before the 2003 AQMP is adopted and submitted to EPA. At present, it is uncertain whether, when, or to what extent EPA will revoke the existing 1-hour ozone standard. Therefore, the 2003 AQMP assumes the 1-hour ozone standard will remain in effect for the foreseeable future.

WHAT IS NEW IN THIS PLAN REVISION?

Each revision of the AQMP represents a snapshot in time, based on the best available information. The 2003 AQMP generally is very similar to the structure of the 1997 Plan and the 1999 amendments to the ozone SIP but like all new editions includes significant enhancements. The key improvements incorporated in the 2003 AQMP are summarized as follows:

1) Revised emissions inventory projections using 1997 as the base year, the CARB on-road motor vehicle emissions model EMFAC2002, and SCAG 2001 Regional Transportation Plan (RTP) forecast assumptions;

2) Revised control strategy that updates remaining control measures from the 1997/1999 SIP and incorporation of new control measures based on current technology assessments;
3) Reliance on 1997 ozone episodes and updated modeling tools for attainment demonstration relative to ozone and PM10; and
4) An initial assessment of progress toward the new federal 8-hour ozone and PM2.5 standards.

HOW WAS THIS PLAN REVISION PREPARED?

This AQMP Revision was developed based on input and participation of numerous individuals and groups since the adoption of the 1997 AQMP and the 1999 amendments. In particular, the District Governing Board formed the AQMP Advisory Group and the Scientific, Technical & Modeling Peer Review (STMPR) Advisory Group to review the overall aspects of a draft AQMP and to make recommendations to staff concerning emission inventories, modeling, control measures, and socioeconomic impacts. The AQMP Advisory Group consists of approximately 50 members representing a cross-section of the community, including major businesses, small businesses, academia, local government, ethnic interests, environmental interests, and appropriate governmental agencies. The STMPR Advisory Group consists of approximately 22 members who are experts in the fields of socio-economic modeling, air quality modeling, air quality and meteorological monitoring, atmospheric science and medicine. In addition to the input from the AQMP and STMPR Advisory Groups in selecting the air quality model for the Plan, staff has also solicited and incorporated feedback from additional air quality modeling experts in the field.

To help provide important technical and scientific data to support the update to the PM10 Plan and provide the foundation for future PM2.5 plans, the Governing Board in December 1997 established the PM10 Technical Enhancement Program (TEP), a multi-year cooperative study designed to provide new ambient data for particulates, improved emissions inventories, and improved models to predict future levels of particulates and ozone. This program, which was designed to build upon the findings of its predecessor, PTEP, was jointly funded by the District, U.S. EPA, City of Los Angeles, County Sanitation Districts of Los Angeles, Western States Petroleum Association, Southern California Gas Company, CalMat, and Southern California Rock Products Association, and successfully delivered critical new analytical tools and information which was directly input to this Plan.

In preparing this Plan, the District coordinated closely with SCAG and the CARB, as well as the U.S. EPA. SCAG has the primary responsibility for providing future growth projections and the development of transportation control measures; ARB has the primary responsibility for the development of mobile source emissions inventories as well as mobile source and consumer product control measures. Their inputs are included in this

Plan. Also, the U.S. EPA participated throughout the plan development process to provide guidance as to federal CAA requirements.

IS AIR QUALITY IMPROVING?

Yes. Over the years, the air quality in the Basin has improved significantly, thanks to the comprehensive control strategies implemented to reduce pollution from mobile and stationary sources. For instance, the total number of days the Basin exceeds the federal 1-hour standard has decreased dramatically over the last two decades from more than 200 days to fewer than 50. However, the Basin still exceeds the federal 1-hour standard more frequently than any other location in the U.S. The Basin is designated as an "extreme" nonattainment area for ozone. Figure ES-1 shows the long-term trend in ambient ozone counts over the last two decades. The figure depicts the number of Basin-days above the federal 1-hour ozone standard, which represents the number of days the standard was exceeded anywhere in the Basin.

In 2001, the Basin exceeded the federal and state standards for PM10, although improvements have been registered on that front as well. Exceedances of the federal annual and 24-hour PM10 standards were confined to Riverside and San Bernardino counties. The more stringent state PM10 standards were exceeded over much larger areas. In 2001, the Basin did not exceed the standards for carbon monoxide, nitrogen dioxide, sulfur dioxide, sulfates or lead. Although the 2002 air quality data has not yet been quality assured/quality controlled, the preliminary data confirms the trend of continued progress. Figure ES-2 shows the annual average PM10 concentrations in the Basin in 2001.

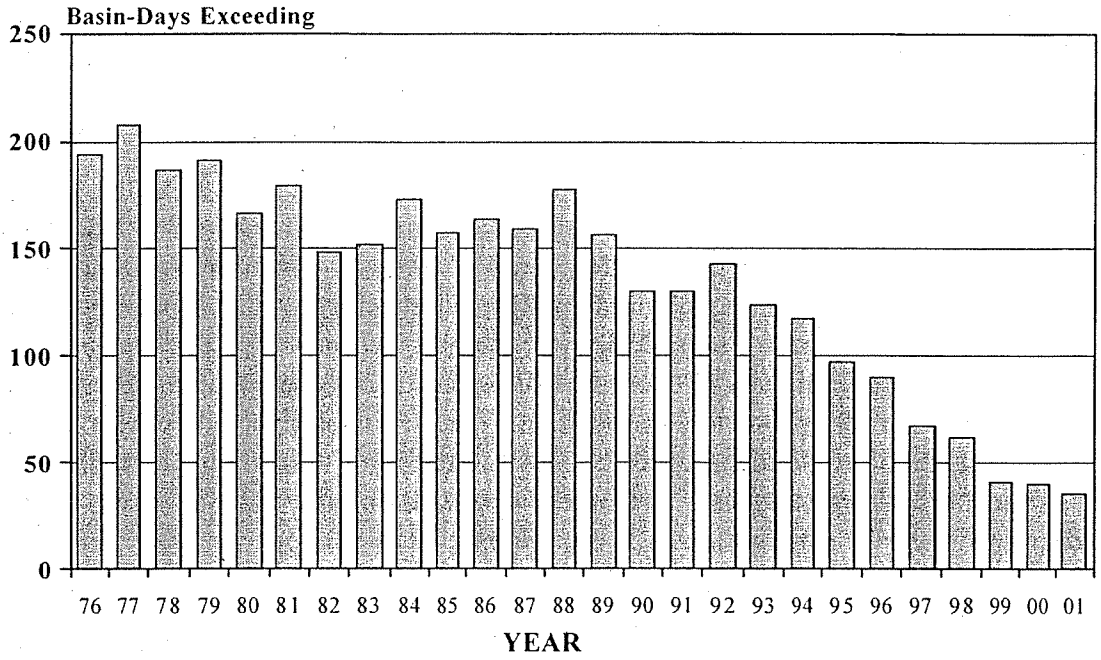

FIGURE ES-1
Total Basin-Days Above the Federal 1-Hour Ozone Standard from 1976-2001

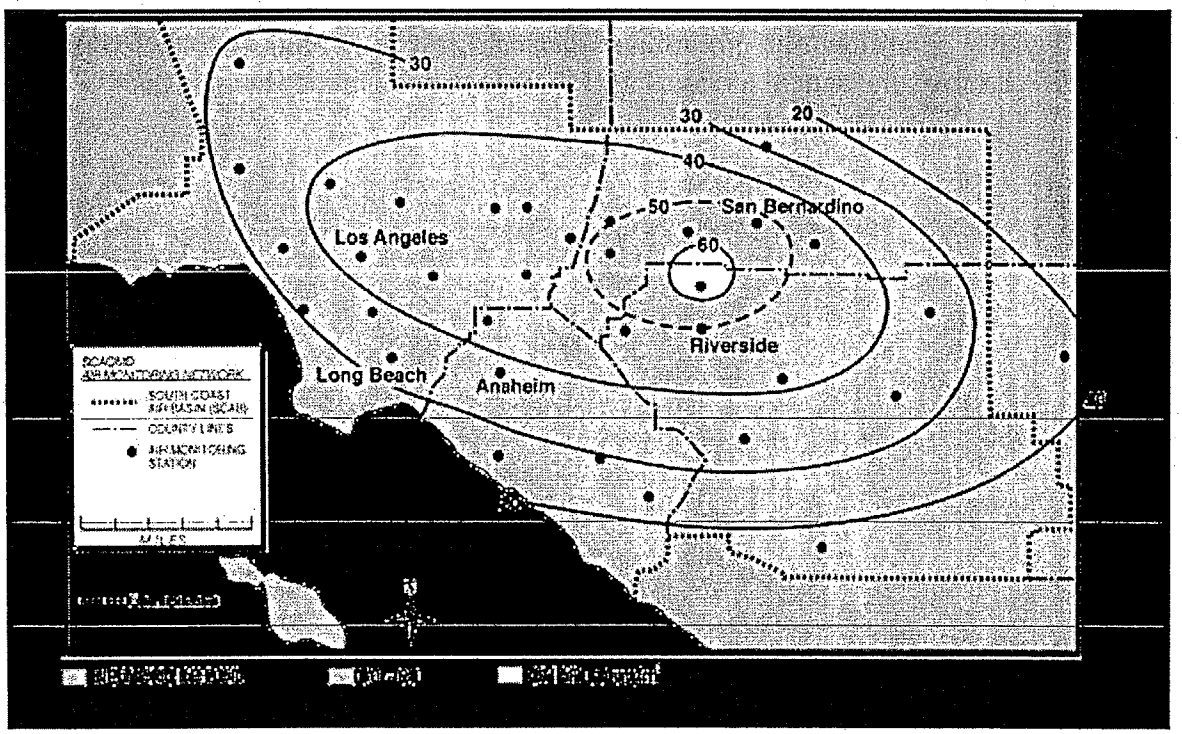

FIGURE ES-2
Annual Average PM10 Concentration in 2001

WHAT ARE THE APPLICABLE KEY STATE AND FEDERAL REQUIREMENTS THAT THIS PLAN REVISION ADDRESSES?

The 1988 California Clean Air Act includes the following key requirements that must be addressed in any AQMP revision: apply Best Available Retrofit Control Technology; reduce nonattainment pollutants and their precursors at a rate of five percent per year, or, if this cannot be done, include all feasible measures and an expeditious implementation schedule; reduce population exposure to nonattainment pollutants (i.e. ozone, carbon monoxide, and nitrogen dioxide for the Basin) according to a prescribed schedule; and, rank control measures by cost-effectiveness and implementation priority. Finally, state law requires the plan to provide for attainment of the federal and state ambient air quality standards at the earliest practicable date.

The 1990 federal Clean Air Act Amendments overhauled the federal planning provisions for areas not meeting federal clean air standards. The amendments identified specific emission reduction goals, required both a demonstration of reasonable further progress and attainment by specified dates, and incorporated more stringent sanctions for failure to attain or to meet interim milestones. The 1997, 1999, and 2003 AQMPs were designed to meet applicable state and federal requirements.

HOW HAS THE EMISSIONS INVENTORY CHANGED?

For this Plan revision, the 1997 emissions inventory is relied upon to establish baseline and future year projections. The inventories were developed according to procedures stemming from the federal Clean Air Act. To meet state and federal law requirements, updated emission inventories for two pre-1997 years (1990 and 1995) as well as nine future years (1998, 2000, 2002, 2005, 2006, 2007, 2008, 2010 and 2020) are also provided.

The 1997 emissions inventory now represents the most comprehensive emissions inventory ever established for the South Coast Air Basin and reflects all regulations that have been adopted and implemented as of 1997. The 1997 emissions inventory serves as the basis for the development of emission forecasts for future years. These forecasts reflect emission reductions from already adopted rules with post-1997 compliance dates and demographic and economic growth forecasts by SCAG.

In developing the revised inventories for this Plan revision, the most up-to-date inventory methodologies and emission factors were used. In addition, special studies were conducted to better quantify ammonia emissions as well as emissions from aircraft and

marine vessels. The most notable inventory change, however, originated from the category of mobile sources. In 2002, CARB released its first off-road emissions inventory model and revised its on-road emissions inventory model, EMFAC2002, which revealed significantly higher past, present and future emissions from mobile sources than previous inventories.

HAS THE OVERALL CONTROL STRATEGY CHANGED SIGNIFICANTLY?

The basic PM10 control strategy contained in the 1997 Plan, augmented by a few additional PM10 control measures included in this Plan revision, appears to be adequate to demonstrate attainment of the federal PM10 standard. With respect to ozone, however, the basic strategy of the 1997 Plan and the 1999 amendments must be significantly overhauled to address the new realities of higher mobile source emissions and lower carrying capacities for ozone as indicated by new modeling and meteorological episodes. Additional reductions, above and beyond those committed to in the 1997 Plan and 1999 amendments, will be necessary to demonstrate attainment with the federal ozone standard and present a significant challenge.

WHAT OTHER REQUIREMENTS ARE ADDRESSED IN THIS PLAN?

Under federal conformity regulations, all federal or federally funded transportation projects must conform to the SIP, and must not be a cause of impeding progress toward attainment of the federal standards. To establish conformity, emissions from future projects must be accounted for in the future baseline emissions inventories, such that the attainment demonstrations include these future emissions. For transportation projects, planning is now underway out to the year 2030. The Plan establishes conformity budgets for the future years based on the 2006 PM10 and 2010 ozone attainment demonstrations. While ozone precursor emissions are expected to continue to decline in future years, primary PM10 emissions are expected to increase due to the expected growth in mobile vehicle population and vehicle miles traveled. To address this increase in primary PM10 emissions from travel while continuing to provide for attainment after 2006, this plan establishes a mechanism for conformity demonstration purposes based on the implementation of the new control measure, "Transportation Conformity Budget Backstop Control Measure" in which commitments are made to achieve additional primary PM10 reductions from transportation-related PM10 source categories in 2020 and 2030 to offset the increased emissions. This measure will be revised in future SIP revisions to reflect updated PM10 emission inventories and attainment demonstrations.

WHAT CONSIDERATIONS HAVE BEEN MADE FOR THE NEW FEDERAL STANDARDS FOR PARTICULATE MATTER AND OZONE?

In 1997, U.S. EPA promulgated new federal standards for ozone and particulate matter. Specifically, U.S. EPA established an 8-hour ozone standard, and a 24-hour and an annual average standard for fine particulates or PM2.5. Although the implementation guidelines for the new standards have not been finalized yet, preliminary feedback for U.S. EPA indicates that the likely attainment dates for the PM2.5 and ozone standards will be 2014 and 2021, respectively. The State Implementation Plans to demonstrate attainment with the new standards are expected to be due in 2007.

Although, the new standards are not technically required to be addressed in the 2003 Plan revision, the District, cognizant of their importance and ramifications, is providing comparative information regarding the current attainment strategies relative to the potential new standards. Generally, this assessment shows that the new standards are more restrictive than the current standards.

WHAT ARE THE CHALLENGES OF ATTAINMENT?

The improved mobile source inventories significantly increased emission estimates for the past, current, and future, causing more reductions needed to attain the standards. Furthermore, the new episode selected for the 2003 AQMP attainment demonstration is more conducive for ozone formation, resulting in a lower carrying capacity than the last plan. The Basin is required to demonstrate attainment of the federal PM10 standards by 2006 and the federal 1-hour ozone standard by 2010. Significant improvements in air quality will be necessary to bring the Basin into attainment by federal deadlines, particularly for the federal 1-hour ozone standard. Therefore, the attainment strategy incorporated in the 2003 AQMP ought to reflect the region's utmost effort in reducing emissions from all sources contributing to Basin's air pollution. To that end, the 2003 AQMP builds upon improvements accomplished from the previous plans, and aims to incorporate all feasible control measures while balancing costs and socioeconomic impacts. The few years remaining to meet attainment deadlines afford little margin for error in implementing such a comprehensive control strategy. Further, one has to make sure that the control strategy selected to attain the current federal PM10 and 1-hour ozone standards will also complement and not significantly conflict with the Basin's future efforts to attain the new federal 8-hour ozone and fine particulate (PM2.5) standards. The improved planning tools incorporated in the 2003 AQMP are vital in designing such a control strategy, and allow for its critical and objective evaluation and its realignment, if necessary.

HAS THE ATTAINMENT PROJECTION CHANGED FOR FEDERAL OR STATE STANDARDS?

No. The 2003 AQMP proposes to attain the state and federal standards in the same time frame as proposed in the 1997 AQMP. However, the portion of necessary emission reductions categorized as long-term measures has grown significantly and highlights the need for early rule adoption of available controls and the continuing need to foster new clean air technology and strategies. (See Figure ES-3.)

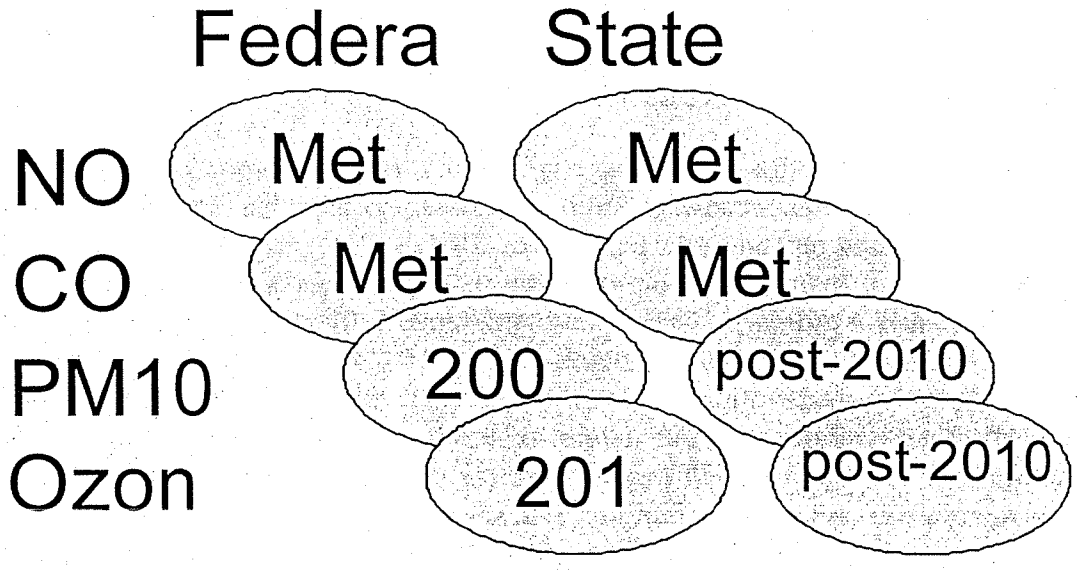

FIGURE ES-3

Attainment Target Dates

BEFORE THE
PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Establish Policies and Rules to Ensure Reliable, Long-Term Supplies of Natural Gas to California.	R.04-01-025

RESPONSIVE TESTIMONY OF SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT TO TESTIMONY AND PROPOSAL OF SAN DIEGO GAS AND ELECTRIC COMPANY AND SOUTHERN CALIFORNIA GAS COMPANY

Barry R. Wallerstein, D.Env.
Executive Officer
South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765
Tel: (909) 396-3131
E-Mail: bwallerstein@aqmd.gov

Date: September 23, 2005

BEFORE THE
PUBLIC UTILITIES COMMISSION AND ENERGY COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Establish Policies and Rules to Ensure Reliable, Long-Term Supplies of Natural Gas to California.	R.04-01-025

RESPONSIVE TESTIMONY OF SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT TO TESTIMONY AND PROPOSAL OF SAN DIEGO GAS AND ELECTRIC COMPANY AND SOUTHERN CALIFORNIA GAS COMPANY

Introduction

The South Coast Air Quality Management District (SCAQMD) appreciates the opportunity to comment on the testimony dated August 12, 2005 of the San Diego Gas & Electric Company and Southern California Gas Company (SDG&E/SCG).

The SCAQMD is responsible for regulating stationary sources and planning for the attainment of the ambient air quality standards for 16 million residents in a four-county area. Although significant improvements in air quality have occurred in our area, we still violate the federal eight-hour ozone standard by 100 days per year. And progress has slowed despite the most stringent stationary source emission regulations anywhere in the country. Our two standards most difficult to meet are the 8-hour ozone standard and the PM2.5 standard, which we exceed by 175 to 250% on the worst air quality days.

In order to achieve these emission standards, emissions of both NOx and VOC must be significantly reduced. For example, NOx, which is a precursor to ozone and $PM_{2.5}$, must be reduced by 48% to achieve the less-stringent 1-hour ozone and PM_{10} standards, and by even more to achieve the more stringent 8-hour ozone and PM standards. These emission reductions will be difficult to achieve.

The District has relied upon the use of clean natural gas, as a critical part of the overall strategy to control and reduce emissions from stationary, as well as mobile sources. Therefore we support efforts to increase supplies of clean natural gas, including clean liquefied natural gas

(LNG), provided that safety, security, and environmental issues are addressed. However, any change to gas quality that causes emission increases is of great concern to us.

There are six proposed LNG terminals that would provide gas to Southern California. While all of them may not be built, the combined potential capacity is about 2/3 of the total California demand, and even more of Southern California demand since they all would supply gas to the SCAQMD area.

SDG&E/SCG Gas Quality Tariff Specification Proposal

SCAQMD is pleased to see that in response to one of our previous comments, SDG&E/SCG is proposing to move the gas quality specification from Rule 30, which applies only to customer-owned gas, to a new Rule 39 that will apply to all gas supplies.

SDG&E/SCG's proposed gas quality specifications are a step in the right direction, in that they tighten the current Rule 30 specifications that allow a wide variation of gas quality. SDG&E/SCG's testimony says their system average heating value and Wobbe Index are 1020 Btu/scf and 1332 Btu/scf[1], respectively. Recent data from the Southern California Gas Company (SoCalGas) website[2] indicate that the current gas quality in the SCAQMD area, as shown in Table 1, is very consistent, with a heating value ranging from 1,014 to 1038 Btu/scf.

Table 1 – Heating Value Data for Natural Gas in SCAQMD

September 2005	
BTU DISTRICT	BTU FACTOR
11	1.024
16	1.038
17	1.036
18	1.022
19	1.025
20	1.025
21	1.026

[1] Prepared Direct Testimony of Larry Sasadeusz, SDG&E/SCG, August 12, 2005, Figure 1

[2] http://socalgas.com/residential/prices/btu/sep05.shtml

22	1.024
23	1.026
40	1.014
41	1.022

Note: a "Btu factor" of 1.024 is equivalent to a heating value of 1,024 Btu/scf.

Combustion equipment in SCAQMD have been adjusted based on these historically low values. The gas in other Btu districts outside SCAQMD were as high as 1102 Btu/scf in the same period, but the combustion equipment in those areas are adjusted based on those historically high values. The current SoCalGas standard allows a heating value of up to 1150 Btu/scf.

If an LNG facility puts 1.0 bcf of regasified LNG at 1150 Btu/scf into the SDG&E/SCG system, many customers in SCAQMD could suddenly have the gas heating value increase 13% to 1150 Btu/scf from the current average of 1020 Btu/scf. Very few combustion equipment can automatically adjust themselves to this change. As a result, the heat input rate will increase and the air-to-fuel ratio will decrease for most equipment. The emissions and safety impacts will vary depending on the type of burner and type of process. Some equipment (lean-burn engines and lean-premix burners on boilers, heaters and gas turbines) that relies on high air-to-fuel ratio and high excess air to reduce NOx will have NOx increases. Other equipment that operates closer to stoichiometric air-to-fuel ratios, with little excess air, may have higher carbon monoxide and unburned hydrocarbon emissions. The increased heating value and heat input rate changes can also increase equipment, process or product temperatures. For some customers, the heating value may switch back and forth from high to low at different times of the day.

Except for the few large combustion devices that continuously monitor their emissions or flue gas oxygen concentrations, combustion equipment operators will be unaware of the changes in fuel quality and emissions. Carbon monoxide and nitric oxide are colorless and odorless, so emission increases will not be apparent unless emission testing is conducted. A lot of small combustion equipment permitted or certified by SCAQMD are not required to test emissions or are only required to test emissions once when the permit is initially issued. Changes in emissions caused by gas quality changes will be undetected.

The SDG&E/SCG proposal includes the Natural Gas Council (NGC)-recommended limit of 1400 Wobbe Index[3]. SCAQMD is deeply concerned that new supplies of LNG at 1400 Wobbe Index would still cause significant NOx increases and even violations of AQMD NOx rules for some equipment in SCAQMD, compared to the current system average Wobbe Index of 1332 Btu/scf. Based on SoCalGas test data[4], NOx emission increases of approximately 117%, 26%, 127%, 37%, 75%, 41% and 20% could be expected from the sensitive equipment tested by SoCalGas with 1400 Btu/scf Wobbe Index gas, compared to the low-Wobbe Index baseline natural gas used in the SoCalGas study.

The significant impact of Wobbe Index on NOx emissions for certain sensitive equipment is obvious from the figures of NOx versus Wobbe Index that are posted on SoCalGas's website[5] and listed as Appendix G in the table of contents of the SoCalGas report, but the figures are missing from the same report submitted on August 12, 2005 to CPUC. The missing figures are shown in Attachment A to these comments.

SCAQMD sponsored emission tests of hot gas at two local universities on a microturbine and a small commercial boiler because of our concerns about high-Btu natural gas. For the microturbine, increasing the Btu content from 1015 to 1138 Btu/scf increased NOx by 20%, although increasing the inert content of the hottest gas to 5.6% mitigated the NOx increase to 4%. Adding inerts reduces the Btu content, reduces the Wobbe Index even more, and reduces combustion temperatures in the same manner as flue gas recirculation. All of these effects lead to significantly less NOx when inert gases are added to hot gas.

The commercial boiler NOx increased from 11% to 17% with higher Btu gases, but adding 3.8% inerts to the hottest gas actually reduced NOx to 3% below the baseline gas.

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[3] White Paper on Natural Gas Interchangeability and Non-Combustion End Use, NGC+ Interchangeability Work Group, February 28, 2005

[4] Final Report - Gas Quality and Liquefied Natural Gas Research Study, Southern California Gas Company, April 2005

[5] http://www.socalgas.com/business/gasquality/docs/App_G%20_NOxEmissionReports.pdf

A 1085 hp stationary, lean-burn engine tested by Southern Research Institute[6] with low and high-Btu natural gas. Even with an air-to-fuel ratio controller was in operation, NOx increased 35% when the lower heating value of the gas increased by only 71 Btu/scf. Without the controller, NOx increased 165% because of the lower air-to-fuel ratio and higher combustion temperatures with the hot gas.

The impact of sudden increases of Wobbe Index to 1400 will have unknown impacts on other end user equipment that has not been tested, especially larger industrial combustion equipment that operate without a lot of excess air. Both the SDG&E/SCG and Pacific Gas and Electric agree with the NGC White Paper recommendation that additional research is needed for many types of equipment. The SDG&E/SCG testimony[7] is contradictory when it says "The proposed standards are appropriate to maintain system and customer safety with reliability and performance standards, and should not result in increased air quality impacts." and then the next sentence says "Additional testing and information will continue to be needed to ensure that all end-use equipment can perform satisfactorily within gas quality specifications."

The NGC White Paper also recommended the Wobbe Index be limited to less than 4% over the historical average for an area, unless a service area has "demonstrated experience" with gas exceeding this level. Based on the current system-wide average of 1332 Btu/scf Wobbe Index, that limit should be 1385 Btu/scf Wobbe for the average area, and less for areas with below-average Wobbe Index gas. The NGC White Paper defines demonstrated experience as "...actual end use experience established by end-use testing and monitoring programs." SDG&E/SCG does not include this requirement in their proposal or address this NGC recommendation in their testimony. They do admit that additional research and testing are needed because data are incomplete for some end uses. SCAQMD is not aware of any monitoring program conducted by SoCalGas to assure that the 5.1% increase in Wobbe Index in SCAQMD allowed by their proposed 1400 maximum Wobbe Index is safe or without significant emission impacts.

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[6] Environmental Technology Verification Report, Miratech Corporation GECO 3001 Air/Fuel Ratio Controller, USEPA, USEPA-GHG-VR-11, September 2001 with additional unpublished data obtained from SRI by SCAQMD

[7] Sasadeusz, page 6, line 24

The Wobbe Index of LNG can be limited by:

- Importing LNG with inherently lower Wobbe Index. BHP Billiton reports in their Prevention of Significant Deterioration Permit Application for the Cabrillo Port Offshore LNG Import Terminal that the Australian gas they have access to is >99% methane, and therefore low in Wobbe Index.
- Removing excessive levels of ethane, propane and higher hydrocarbons from the LNG at the terminal. The proposed Sound Energy Solutions LNG terminal in Long Beach will have a natural gas liquids recovery unit to reduce the non-methane hydrocarbons content of the gas.
- Adding inerts such as nitrogen or carbon dioxide. The LNG facility in Cove Point, Maryland is required to add nitrogen to LNG to improve its interchangeability with other natural gas supplies and reduce carbon monoxide emissions from some sensitive residential appliances. The Sound Energy Solutions facility is proposed to have equipment to produce and inject nitrogen into the vaporized natural gas.

Although some LNG terminals have these facilities improve the gas quality, they won't use the equipment unless they have to in order to meet required gas quality specifications.

Because emission increases must be avoided in the SCAQMD area, and the full impacts of the SDG&E/SCG-recommended 1400 Wobbe Index limit are not yet known, SCAQMD recommends that large new gas supplies that will affect SCAQMD, like those from the proposed LNG terminals, be limited to 2% over the historical average for our area. If the system average Wobbe Index is 1332 Btu/scf, as stated in the SDG&E/SCG testimony, then the limit should be about 1360 Btu/scf. The Wobbe Index of a gas can be reduced from 1400 to 1360 by increasing the nitrogen content by only 2% by volume.

Regarding the CPUC's question of whether the California Air Resources Board compressed natural gas (CNG) specifications should be incorporated into gas utility tariffs, SCAQMD believes they should be referenced by the tariffs as a requirement for large gas suppliers like LNG terminals. Once out-of-spec gas is put into the pipeline distribution system, it is impractical

to treat the gas at CNG stations, and will make locating new CNG stations more difficult. Additional CNG stations should be encouraged to meet the increasing interest in CNG vehicles.

SCAQMD also recommends that expedited research is needed in the following areas:

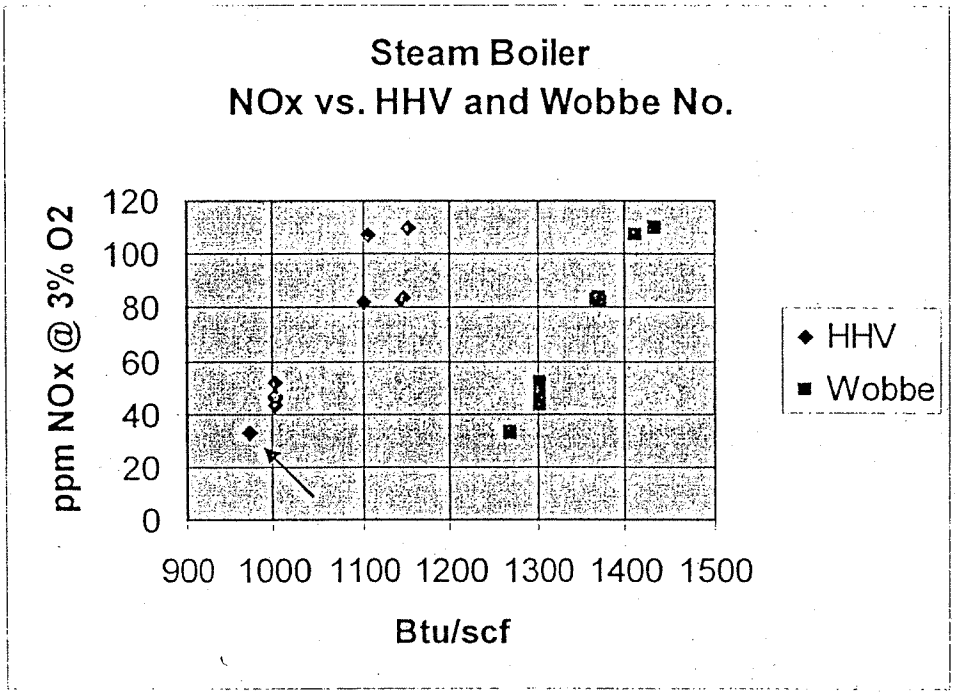
- Emission studies of the impacts of hot gas on combustion equipment, particularly larger combustion and power generation sources for which little data presently exists.
- Effects of inert gas addition on large and small equipment.
- Analysis of the regional air quality impacts from high-Btu LNG importation.
- Cost analyses of different mitigation measures, including gas treatment and end use equipment modifications.

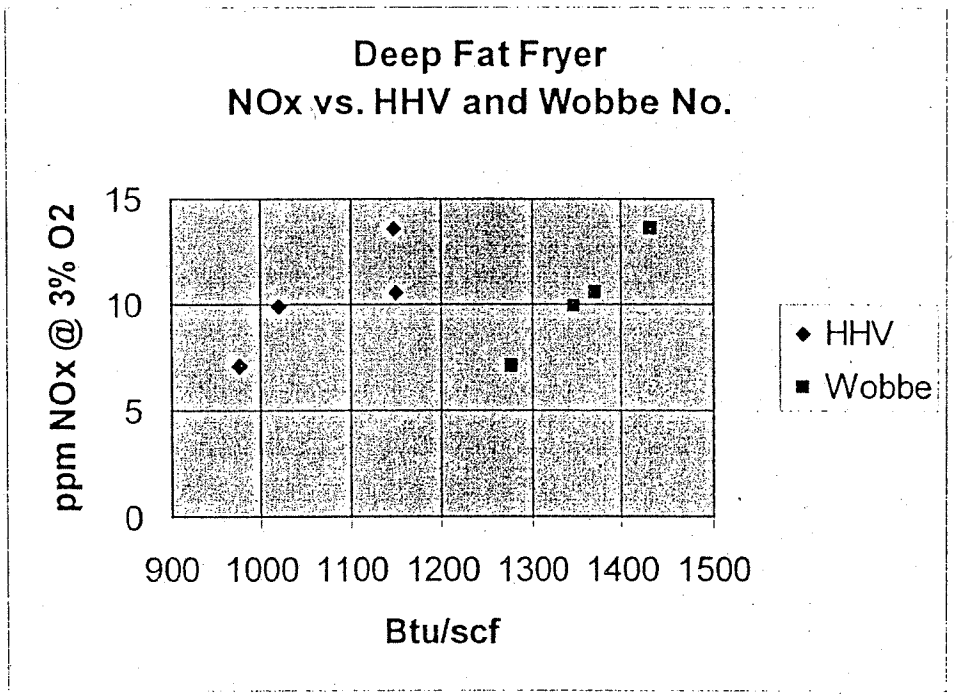
With this information, the costs, benefits and cost-effectiveness of mitigation measures can be evaluated.

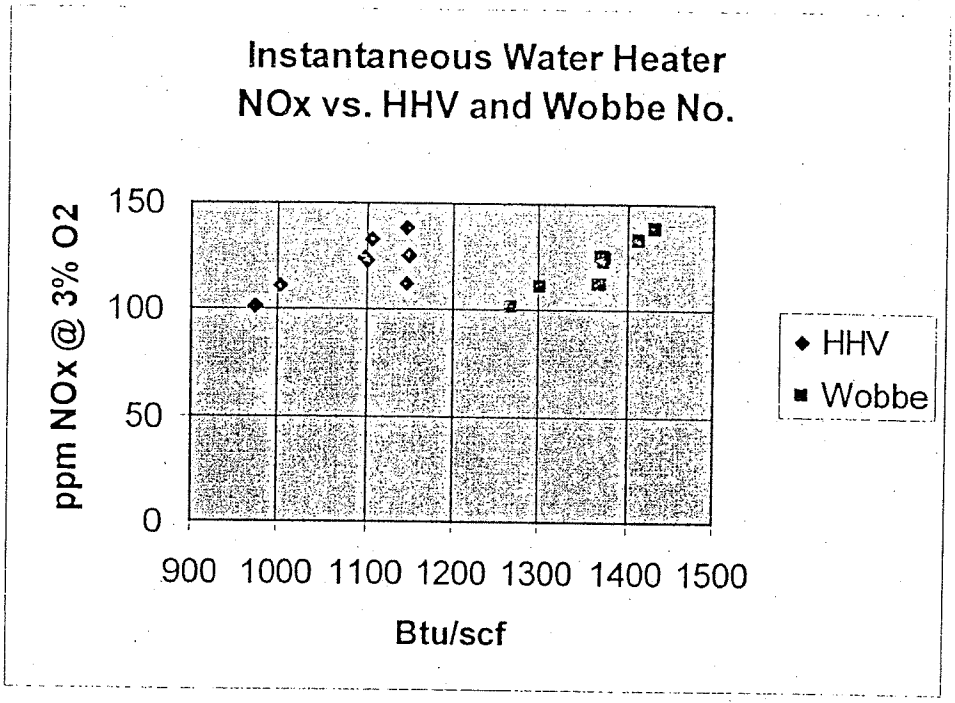
Respectfully submitted by,

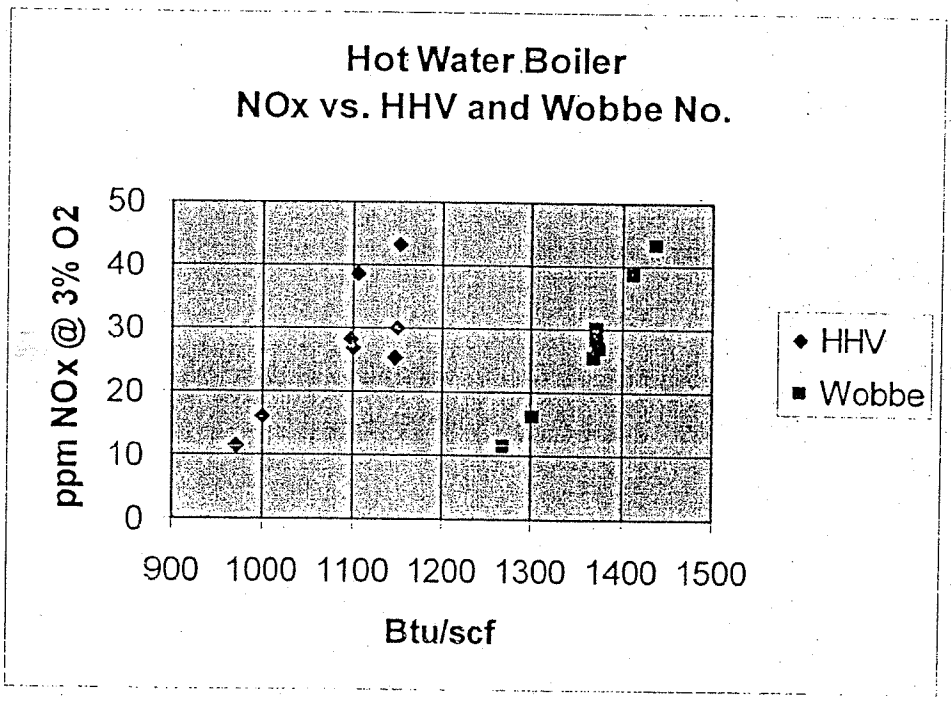
Barry R. Wallerstein, D.Env.
Executive Officer
South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765
Tel: (909) 396-3131
E-Mail: bwallerstein@aqmd.gov

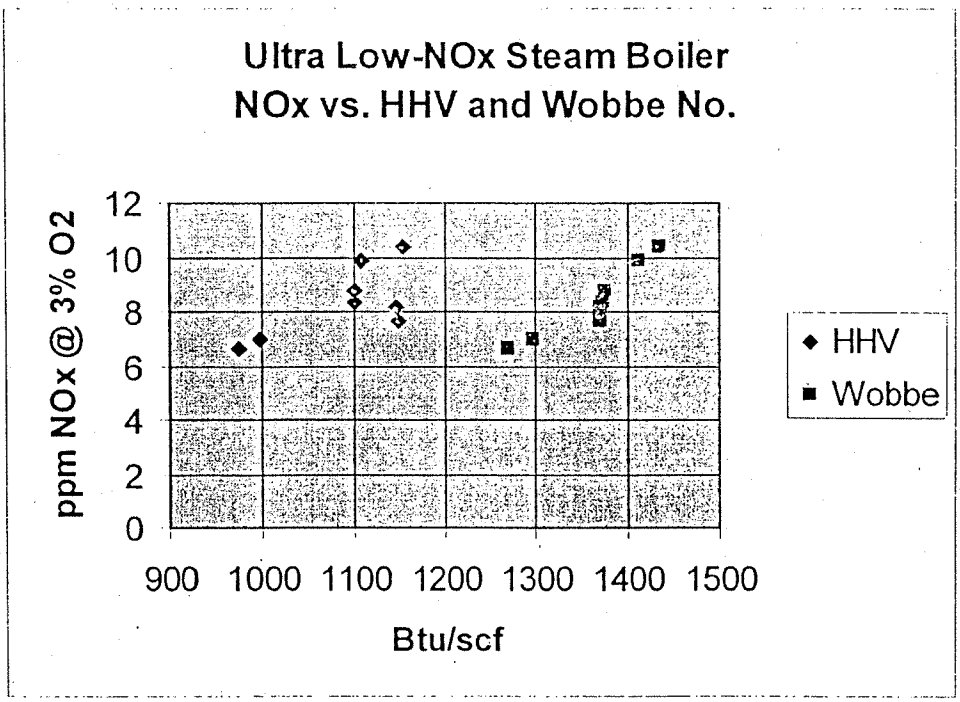
Attachment A – Selected Figures from Appendix G of Final Report - Gas Quality and Liquefied Natural Gas Research Study, Southern California Gas Company, April 2005

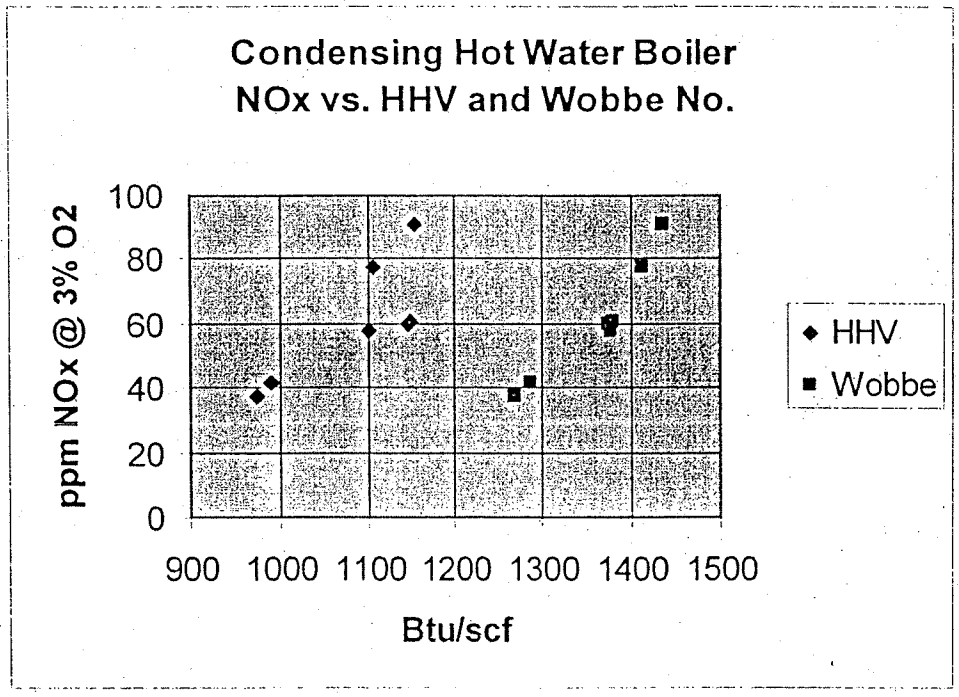


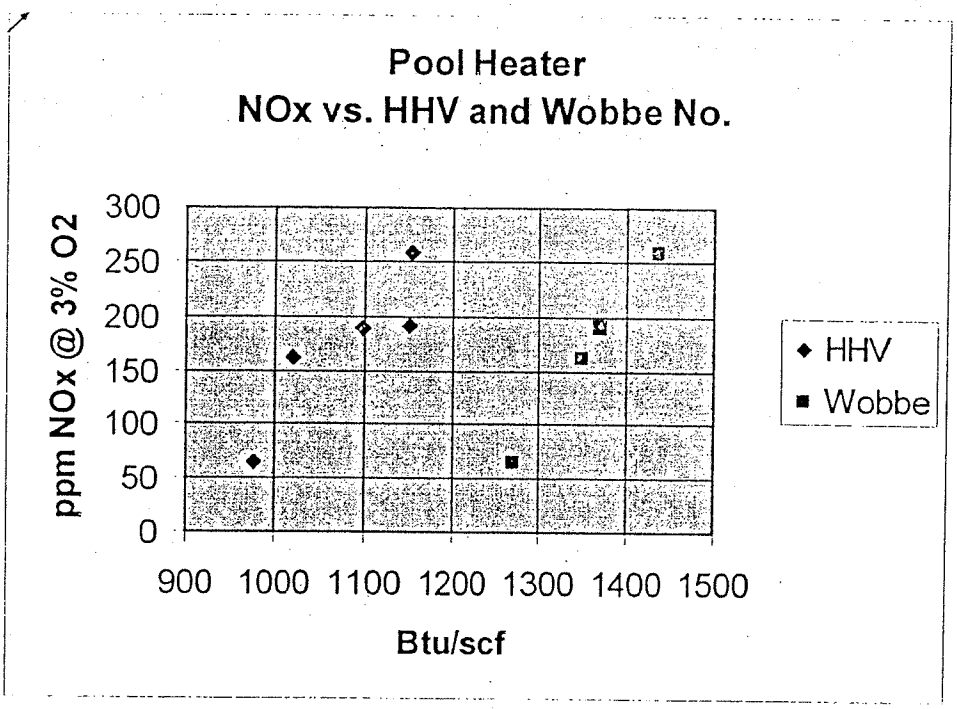



Instantaneous Water Heater
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
150
100
50
0
900 1000 1100 1200 1300 1400 1500
Btu/scf
HHV
Wobbe


Hot Water Boiler
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
50
40
30
20
10
0
900 1000 1100 1200 1300 1400 1500
Btu/scf
HHV
Wobbe


Ultra Low-NOx Steam Boiler
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
12
10
8
6
4
2
0
900 1000 1100 1200 1300 1400 1500
Btu/scf
HHV
Wobbe


Condensing Hot Water Boiler
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
100
80
60
40
20
0
900 1000 1100 1200 1300 1400 1500
Btu/scf
HHV
Wobbe


Pool Heater
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
300
250
200
150
100
50
0
900 1000 1100 1200 1300 1400 1500
Btu/scf
HHV
Wobbe

CERTIFICATE OF SERVICE

I hereby certify that I have served, this day, a copy of the foregoing **COMMENTS OF SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, ON GAS QUALITY ISSUES** on the service list for **R.04-01-025** by electronic mail to each party.

Executed on September 22, 2005, at Diamond Bar, California.

_____

Martin Kay

Service List Attached

1999 HARRISON STREET, SUITE 1440
OAKLAND, CA 94612
mrw@mrwassoc.com

517-B POTRERO AVENUE
SAN FRANCISCO, CA 94110
Cem@newsdata.com

CASE ADMINISTRATION
2244 WALNUT GROVE AVENUE, ROOM 321
ROSEMEAD, CA 91770
case.admin@sce.com

ATTORNEY AT LAW MICHAEL P. ALCANTAR
1300 SW FIFTH AVENUE, SUITE 1750
PORTLAND, OR 97201
mpa@a-klaw.com

MICHAEL S. ALEXANDER
2244 WALNUT GROVE
ROSEMEAD, CA 91770
Michael.Alexander@sce.com

Joyce Alfton
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
alf@cpuc.ca.gov

DIRECTOR OF POLICY AND PLANNING SCOTT J. ANDERS
8520 TECH WAY - SUITE 110
SAN DIEGO, CA 92123
scott.anders@sdenergy.org

LAURIE C. ANGEL
458 E. PLATT STREET
LONG BEACH, CA 90805
casadcl@charter.net

ATTORNEY AT LAW JEANNE B. ARMSTRONG
505 SANSOME STREET, SUITE 900
SAN FRANCISCO, CA 94111
jarmstrong@gmssr.com

Nilgun Atamturk
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
nil@cpuc.ca.gov

DEVRA BACHRACH
111 SUTTER STREET, 20TH FLOOR
SAN FRANCISCO, CA 94104
dbachrach@nrdc.org

ATTORNEY AT LAW CAROLYN A. BAKER
7456 DELTAWIND DRIVE
SACRAMENTO, CA 95831
cabaker906@sbcglobal.net

TOM BEACH
2560 NINTH STREET, SUITE 316
BERKELEY, CA 94710
tomb@crossborderenergy.com

JEFFREY F. BECK
201 CALIFORNIA STREET, 17TH FLOOR
SAN FRANCISCO, CA 94111
smalllecs@cwclaw.com

ASSISTANT GENERAL COUNSEL BUD J. BECKER
370 VAN GORDON STREET
LAKEWOOD, CO 80228
bud_becker@kindermorgan.com

ORNEY AT LAW C. SUSIE BERLIN
100 PARK CENTER PLAZA, SUITE 501
SAN JOSE, CA 95113
sberlin@mccarthylaw.com

ATTORNEY AT LAW ROGER A. BERLINER
700 12TH STREET, N.W.
WASHINGTON, DC 20005
rberliner@manatt.com

ATTORNEY AT LAW ANDY BETTWY
5241 SPRING MOUNTAIN ROAD
LAS VEGAS, NV 89150
andy.bettwy@swgas.com

ATTORNEY AT LAW W. LEE BIDDLE
401 WEST A STREET, SUITE 1600
SAN DIEGO, CA 92101
lbiddle@ferrisbritton.com

DEPUTY ATTORNEY GENERAL CLARENCE BINNINGER
455 GOLDEN GATE AVE., SUITE 11000
SAN FRANCISCO, CA 94102-7004
clarence.binninger@doj.ca.gov

ATTORNEY AT LAW SCOTT BLAISING
8980 MOONEY ROAD
ELK GROVE, CA 95624
blaising@braunlegal.com

JAMES A. BOOTHE
50 CALIFORNIA STREET, 28TH FLOOR
SAN FRANCISCO, CA 94111
james.boothe@hklaw.com

M. PHYLLIS BOURQUE
3022 CORRALES ROD
CORRALES, NM 87048
Phyllis@abqenergy.com

MATTHEW BRADY
2339 GOLD MEADOW WAY, SUITE 230
GOLD RIVER, CA 95670
matt@bradylawus.com

KENNETH J. BRENNAN
77 BEALE STREET, MAILCODE B9A
SAN FRANCISCO, CA 94105
kjbh@pge.com

CORY J. BRIGGS
99 EAST C STREET, SUITE 111
UPLAND, CA 91786
cory@briggslawcorp.com

ASSISTANT GENERAL COUNSEL DAVID K. BROOKS
1220 SOUTH SAINT FRANCIS DRIVE
SANTA FE, NM 87505
david.brooks@state.nm.us

BARRY BRUNELLE
BOX 15830
SACRAMENTO, CA 95852-1830
bbrunel@smud.org

JOHN BURKHOLDER
2023 TUDOR LANE
FALLBROOK, CA 92028
burkee@cts.com

ATTORNEY AT LAW JAMES M. BUSHEE
1275 PENNSYLVANIA AVENUE
WASHINGTON, DC 20004
jbushee@sablaw.com

Eugene Cadenasso
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
cpe@cpuc.ca.gov

RAY CAMACHO
1500 WARBURTON AVENUE
SANTA CLARA, CA 95050
rcamacho@ci.santa-clara.ca.us

Andrew Campbell
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
agc@cpuc.ca.gov

DIVISION OF OIL GAS GEOTHERMAL RESOURCES JIM CAMPION
801 K STREET, MS 20-20
SACRAMENTO, CA 95814
Jim.Campion@conservation.ca.gov

ATTORNEY AT LAW DAN L. CARROLL
555 CAPITOL MALL, 10TH FLOOR
SACRAMENTO, CA 95814
dcarroll@downeybrand.com

SHERYL CARTER
111 SUTTER STREET, 20TH FLOOR
SAN FRANCISCO, CA 94104
scarter@nrdc.org

CENTRAL FILES
555 W. FIFTH STREET, GT14D6
LOS ANGELES, CA 90013-1011
centralfiles@semprautilities.com

Laurence Chaset
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
lau@cpuc.ca.gov

HOWARD CHOY
1100 NORTH EASTERN AVENUE
LOS ANGELES, CA 90063
hchoy@isd.co.la.ca.us

JOHN A. CIOFFIU
288 CAMPUS DRIVE
STANFORD, CA 94305
John.cioffi@ps.ge.com

AVIS CLARK
4160 DUBLIN BLVD.
DUBLIN, CA 94568
aclark@calpine.com

CHIEF GENERAL COUNSEL STEVEN COHN
6201 S STREET, M.S.B406 PO BOX 15830
SACRAMENTO, CA 95852-1830
scohn@smud.org

REGINA COSTA
711 VAN NESS AVENUE, SUITE 350
SAN FRANCISCO, CA 94102
rcosta@turn.org

ATTORNEY AT LAW BRIAN T. CRAGG
505 SANSOME STREET, SUITE 900
SAN FRANCISCO, CA 94111
bcragg@gmssr.com

MARGARET CROSSEN
450 1ST STREET S.W.
CALGARY, AB T2P 5H1
margaret_crossen@transcanada.com

MICHAEL A. CRUMLEY
2 NORTH NEVADA AVE.
COLORADO SPRINGS, CO 80903
michael.crumley@elpaso.com

ATTORNEY AT LAW MICHAEL B. DAY
505 SANSOME STREET, SUITE 900
SAN FRANCISCO, CA 94111
mday@gmssr.com

DIRECTOR, REGULATORY AFFAIRS RALPH DENNIS
9960 CORPORATE CAMPUS DRIVE, SUITE 2000
LOUISVILLE, KY 40223
ralph.dennis@constellation.com

LOS ANGELES DOCKET OFFICE
320 W. 4TH STREET, SUITE 500
LOS ANGELES, CA 90013
LAdocket@cpuc.ca.gov

ATTORNEY AT LAW DANIEL W. DOUGLASS
21700 OXNARD STREET, SUITE 1030
WOODLAND HILLS, CA 91367
douglass@energyattorney.com

ATTORNEY AT LAW ELAINE M. DUNCAN
711 VAN NESS AVENUE, SUITE 300
SAN FRANCISCO, CA 94102
elaine.duncan@verizon.com

David R Effross
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
dre@cpuc.ca.gov

STEVE ENDO
45 EAST GLENARM STREET
PASADENA, CA 91105
sendo@ci.pasadena.ca.us

PETER G. ESPOSITO
PO BOX 668
CRESTED BUTTE, CO 81224
pesposito@cbcatalysts.com

Roy Evans
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
rle@cpuc.ca.gov

CLAY E. FABER
555 WEST FIFTH STREET, GT-14E7
LOS ANGELES, CA 90013
cfaber@semprautilities.com

PAUL FENN
4281 PIEDMONT AVENUE
OAKLAND, CA 94611
paulfenn@local.org

DIRECTOR, PRICING AND BUSINESS ANALYSIS LESLIE FERRON-JONES
1400 SW 5TH AVE., SUITE 900
PORTLAND, OR 97201
leslie_ferron-jones@transcanada.com

DANIEL W. FESSLER
50 CALIFORNIA STREET, SUITE 2800
SAN FRANCISCO, CA 94111
daniel.fessler@hklaw.com

LAW DEPARTMENT FILE ROOM
PO BOX 7442
SAN FRANCISCO, CA 94120-7442
cpuccases@pge.com

VICTORIA P. FLEMING
3100 ZINFANDEL DRIVE, SUITE 600
RANCHO CORDOVA, CA 95670-6078
vfleming@navigantconsulting.com

ASSISTANT GENERAL MANAGER
FREDRIC C. FLETCHER
164 WEST MAGNOLIA BLVD.
BURBANK, CA 91502
ffletcher@ci.burbank.ca.us

ATTORNEY AT LAW MARK FOGELMAN
ONE EMBARCADERO CENTER, 30TH FLOOR
SAN FRANCISCO, CA 94111
mfogelman@steefel.com

ORLANDO B. FOOTE
895 BROADWAY STREET
EL CENTRO, CA 92243-2341
ofoote@hkcf-law.com

VICE PRESIDENT BRUCE FOSTER
601 VAN NESS AVENUE, STE. 2040
SAN FRANCISCO, CA 94102
bruce.foster@sce.com

ATTORNEY AT LAW MATTHEW FREEDMAN
711 VAN NESS AVENUE, SUITE 350
SAN FRANCISCO, CA 94102
freedman@turn.org

PETER FROST
PO BOX 2197
HOUSTON, TX 77252
pete.frost@conoco.com

David K. Fukutome
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
dkf@cpuc.ca.gov

ATTORNEY AT LAW NORMAN J. FURUTA
2001 JUNIPERO SERRA BLVD., SUITE 600
DALY CITY, CA 94014-3890
norman.furuta@navy.mil

MANAGER/GAS RESOURCES PLANNING
RANDALL P. GABE
5241 SPRING MOUNTAIN ROAD
LAS VEGAS, NV 89150
randy.gabe@swgas.com

PRESIDENT WILLIAM S. GARRETT, JR.
5501 TILBURY DR.
HOUSTON, TX 77056-2017
wgarrettesi@aol.com

Belinda Gatti
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
beg@cpuc.ca.gov

Maryam Ghadessi
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
mmg@cpuc.ca.gov

Patrick L. Gileau
770 L STREET, SUITE 1050
SACRAMENTO, CA 95814
plg@cpuc.ca.gov

MELANIE L. GILLETTE
980 9TH STREET, SUITE 1420
SACRAMENTO, CA 95814
mlgillette@duke-energy.com

ORNEY AT LAW DAVID J. GILMORE
555 WEST FIFTH STREET
LOS ANGELES, CA 90013-1011
dgilmore@sempra.com

ASSISTANT ATTORNEY GENERAL
RONALD M. GITECK
445 MINNESOTA STREET
ST. PAUL, MN 55101-2127
ron.giteck@state.mn.us

AMY GOLD
909 FANNIN, SUITE 700
HOUSTON, TX 77010
agold@coral-energy.com

ALEX GOLDBERG
ONE WILLIAMS CENTER, SUITE 4100
TULSA, OK 74172
alex.goldberg@williams.com

FUELS OFFICE JAIRAM GOPAL
1516 NINTH STREET, MS-23
SACRAMENTO, CA 95814-5512
jgopal@energy.state.ca.us

REGULATORY SPECIALIST R.E. GREEN
2811 HAYES ROAD, ROOM 2336R
HOUSTON, TX 77082

STEVEN A. GREENBERG
4100 ORCHARD CANYON LANE
VACAVILLE, CA 95688
steveng@destrategies.com

NED GREENWOOD
PO BOX 45360
SALT LAKE CITY, UT 84145-0360
Ned.Greenwood@questar.com

Jacqueline Greig
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
jnm@cpuc.ca.gov

REGULATORY POLICY MANAGER
YVONNE GROSS
101 ASH STREET
SAN DIEGO, CA 92103
ygross@sempraglobal.com

PETER W. HANSCHEN
101 YGNACIO VALLEY ROAD, SUITE 450
WALNUT CREEK, CA 94596-8130
phanschen@mofo.com

SENIOR SPECIALIST/STATE REGULATORYAFFAIR ANITA HART
5241 SPRING MOUNTAIN ROAD
LAS VEGAS, NV 89150
anita.hart@swgas.com

ATTORNEY AT LAW MARCEL HAWIGER
VAN NESS AVENUE, SUITE 350
FRANCISCO, CA 94102
marcel@turn.org

ATTORNEY AT LAW CHRISTOPHER HILEN
ONE EMBARCADERO CENTER, SUITE 600
SAN FRANCISCO, CA 94111
chrishilen@dwt.com

ATTORNEY AT LAW SETH HILTON
101 YGNACIO VALLEY ROAD, SUITE 450
WALNUT CREEK, CA 94596-8130
shilton@mofo.com

GARY HINNERS
PO BOX 148
HOUSTON, TX 77001-0148
ghinners@reliant.com

GLOBAL LNG BUSINESS UNIT BEN HO
501 WESTLAKE PARK BLVD.
HOUSTON, TX 77079
hobs@bp.com

SANTA BARBARA COUNTY AIR POLLUTION GARY HOFFMAN
260 NORTH SAN ANTONIO ROAD, STE. A
SANTA BARBARA, CA 93110
hoffmang@sbcapcd.org

Martin Homec
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
mxh@cpuc.ca.gov

ATTORNEY AT LAW DAVID L. HUARD
11355 WEST OLYMPIC BOULEVARD
LOS ANGELES, CA 90064
dhuard@manatt.com

ATTORNEY AT LAW GLORIA M. ING
2244 WALNUT GROVE AVENUE
ROSEMEAD, CA 91770
gloria.ing@sce.com

BRUNO JEIDER
164 WEST MAGNOLIA BOULEVARD
BURBANK, CA 91502
bjeider@ci.burbank.ca.us

LARRY JENKINS
5 GREENWAY PLAZA
HOUSTON, TX 77046-0504
Larry_Jenkins@oxy.com

BEN JOHNSON
1400 SW FIFTH AVENUE, SUITE 900
PORTLAND, OR 97201
ben_johnson@transcanada.com

ATTENTION DAVID JONES CORP. REAL ESTATE DAVID JONES
3033 NOTH 3RD AVENUE
PHOENIX, AZ 85013
djones2@chw.edu

BRIAN M. JONES
47 JUNCTION SQUARE DRIVE
CONCORD, MA 1742
bjones@mjbradley.com

ATTORNEY AT LAW MARC D. JOSEPH
601 GATEWAY BLVD. STE 1000
SOUTH SAN FRANCISCO, CA 94080
mdjoseph@adamsbroadwell.com

ATTORNEY AT LAW EVELYN KAHL
120 MONTGOMERY STREET. SUITE 2200
SAN FRANCISCO, CA 94104
ek@a-klaw.com

ATTORNEY AT LAW JOE KARP
3 EMBARCADERO CENTER, 22ND FLOOR
SAN FRANCISCO, CA 94111
jkarp@whitecase.com

PROGRAM SUPERVISOR MARTIN KAY
21865 COPLEY DR.
DIAMOND BAR, CA 91765-3252
mkay@aqmd.gov

CURTIS KEBLER
2121 AVENUE OF THE STARS
LOS ANGELES, CA 90067
curtis.kebler@gs.com

ATTORNEY AT LAW RANDALL W. KEEN
11355 WEST OLYMPIC BLVD.
LOS ANGELES, CA 90064
pucservice@manatt.com

CAROLYN M. KEHREIN
1505 DUNLAP COURT
DIXON, CA 95620-4208
cmkehrein@ems-ca.com

ATTORNEY AT LAW DOUGLAS K. KERNER
2015 H STREET
SACRAMENTO, CA 95814
dkk@eslawfirm.com

Sepideh Khosrowjah
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
skh@cpuc.ca.gov

ATTORNEY AT LAW GREGORY KLATT
411 E. HUNTINGTON DRIVE, SUITE 107-356
ARCADIA, CA 91007
klatt@energyattorney.com

ERIC KLINKNER
150 LOS ROBLES AVENUE, SUITE 200
PASADENA, CA 91101-2437
eklinkner@ci.pasadena.ca.us

STEPHEN G. KOERNER
PO BOX 1087
COLORADO SPRINGS, CO 80944
steve.koerner@elpaso.com

PAUL I. KORMAN
1050 THOMAS JEFFERSON STREET, NW
WASHINGTON, DC 20007
pik@vnf.com

EDGAR KUIPERS
909 FANNIN, PLAZA LEVEL 1
HOUSTON, TX 77010
edgar.kuipers@shell.com

ATTORNEY AT LAW PAUL C. LACOURCIERE
101 SECOND STREET, SUITE 1800
SAN FRANCISCO, CA 94105
placourciere@thelenreid.com

GERALD L. LAHR
101 EIGHTH STREET
OAKLAND, CA 94607
JerryL@abag.ca.gov

DIRECTOR, REGULATORY AFFAIRS STEVE LAVIGNE
4 TRIAD CENTER SUITE 1000
SALT LAKE CITY, UT 84180
sslavigne@duke-energy.com

Diana L. Lee
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
dil@cpuc.ca.gov

Kelly C Lee
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
kcl@cpuc.ca.gov

ATTORNEY AT LAW JOHN W. LESLIE
11988 EL CAMINO REAL, SUITE 200
SAN DIEGO, CA 92130
jleslie@luce.com

DONALD C. LIDDELL
21700 OXNARD STREET, SUITE 1030
WOODLAND HILLS, CA 91367
liddell@energyattorney.com

LISA LIEU
PO BOX 770000, MAIL CODE B9A
SAN FRANCISCO, CA 94177-0001
lkl1@pge.com

KAREN LINDH
7909 WALERGA ROAD, NO. 112
ANTELOPE, CA 95843
karen@klindh.com

ATTORNEY AT LAW FRANK R. LINDH
77 BEALE STREET
SAN FRANCISCO, CA 94120-7442
frl3@pge.com

STEVEN G. LINS
613 EAST BROADWAY, SUITE 220
GLENDALE, CA 91206-4394
slins@ci.glendale.ca.us

James Loewen
320 WEST 4TH STREET SUITE 500
LOS ANGELES, CA 90013
loe@cpuc.ca.gov

RESOURCE PLANNING RAVEEN MAAN
PO BOX 10250
PALO ALTO, CA 94303
raveen_maan@city.palo-alto.ca.us

WILLLIE MANUEL
PO BOX 949
TURLOCK, CA 95382-0949
wgmanuel@tid.org

JANEE MARLAN
3310 EL CAMINO AVENUE, SUITE 120
SACRAMENTO, CA 95821
jmarlan@water.ca.gov

GLENN MARTIN
1350 TRENT BOULEVARD
WALNUT CREEK, CA 94596
glenn.martin@mirant.com

ATTORNEY AT LAW MARTIN A. MATTES
50 CALIFORNIA STREET, 34TH FLOOR
SAN FRANCISCO, CA 94111
mmattes@nossaman.com

ATTORNEY AT LAW WALKER A.
MATTHEWS
2244 WALNUT GROVE AVENUE
ROSEMEAD, CA 91770
walker.matthews@sce.com

CHRISTOPHER J. MAYER
PO BOX 4060
MODESTO, CA 95352-4060
chrism@mid.org

RICHARD MCCANN
2655 PORTAGE BAY ROAD, SUITE 3
DAVIS, CA 95616
rmccann@umich.edu

RY F. MCCARTHY
100 PARK CENTER PLAZA, SUITE 501
SAN JOSE, CA 95113
bmcc@mccarthylaw.com

ATTORNEY AT LAW KEITH MCCREA
1275 PENNSYLVANIA AVENUE, NW
WASHINGTON, DC 20004-2415
keith.mccrea@sablaw.com

DANIEL MCLAFFERTY
77 BEALE ST., B9A
SAN FRANCISCO, CA 94105
mdm8@pge.com

BRUCE MCLAUGHLIN
915 L STREET, SUITE 1420
SACRAMENTO, CA 95814
mclaughlin@braunlegal.com

ATTORNEY AT LAW ROBERT B.
MCLENNAN
77 BEALE STREET, B30A
SAN FRANCISCO, CA 94105
rbm4@pge.com

JACK MCNAMARA
PO BOX 1380
AGOURA HILLS, CA 91376
jackmack@suesec.com

ATTORNEY AT LAW JAMES W.
MCTARNAGHAN
ONE EMBARCADERO CENTER, 30/F
SAN FRANCISCO, CA 94111
Jmctarnaghan@steefel.com

KARL W. MEYER
180 CIRBY WAY
ROSEVILLE, CA 95678
karl@ncpa.com

ATTORNEY AT LAW KAREN NORENE
MILLS
2300 RIVER PLAZA DRIVE
SACRAMENTO, CA 95833
kmills@cfbf.com

MARCIE MILNER
4445 EASTGATE MALL, SUITE 100
SAN DIEGO, CA 92121
mmilner@coral-energy.com

J. CURTIS MOFFATT
1050 THOMAS JEFFERSON STREET, NW
WASHINGTON, DC 20007
jcm@vnf.com

VICE PRESIDENT & PROJECT MANAGER
KIRK T. MORGAN
2755 E. COTTONWOOD PARKWAY,
SUITE 300
SALT LAKE CITY, UT 84121
kirk.morgan@kernrivergas.com

ASSISTANT CITY ATTORNEY RICHARD
MORILLO
ST OFFICE BOX 6459
BURBANK, CA 91510-6459
rmorillo@ci.burbank.ca.us

Harvey Y. Morris
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
hym@cpuc.ca.gov

DARCY MORRISON
77 BEALE STREET, MAILCODE B9A
SAN FRANCISCO, CA 94105
d2mr@pge.com

3ETH MUSICH
555 W. FIFTH STREET, 14D6
.OS ANGELES, CA 90013
)musich@semprautilities.com

Richard A. Myers
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
ram@cpuc.ca.gov

JEFF NAHIGIAN
311 D STREET, SUITE A
WEST SACRAMENTO, CA 95605
jeff@jbsenergy.com

ROB NEENAN
980 NINTH STREET, SUITE 230
SACRAMENTO, CA 95814
rob@clfp.com

ATTORNEY STEVEN C. NELSON
101 ASH STREET HQ 13D
SAN DIEGO, CA 92101-3017
snelson@sempra.com

TIM NICHOLS
PO BOX 496071
REDDING, CA 96049-6071

ATTORNEY AT LAW DAVID M. NORRIS
3100 NEIL ROAD, PO BOX 10100
RENO, NV 89520-0024
dnorris@sppc.com

DAVID E. NOVITSKI
101 SECOND STREET, STE. 1800
SAN FRANCISCO, CA 94105

RONALD G. OECHSLER
3100 ZINFANDEL DRIVE, SUITE 600
RANCHO CORDOVA, CA 95670-6078
roechsler@navigantconsulting.com

CALIFORNIA ENERGY RESOURCES
SCHEDULING JOHN PACHECO
3310 EL CAMINO AVENUE
SACRAMENTO, CA 95821
jpacheco@water.ca.gov

LIANNE PARKER
164 WEST MAGNOLIA BLVD.
BURBANK, CA 91502
lparker@ci.burbank.ca.us

JUDY PAU
ONE EMBARCADERO CENTER, SUITE 600
SAN FRANCISCO, CA 94111-3834
judypau@dwt.com

ATTORNEY AT LAW JOE PAUL
5976 W. LAS POSITAS BLVD., NO. 200
PLEASANTON, CA 94588
joe.paul@dynegy.com

ATTORNEY AT LAW NORMAN A. PEDERSEN
444 SOUTH FLOWER STREET, SUITE 1500
LOS ANGELES, CA 90071-2916
npedersen@hanmor.com

ATTORNEY CARLOS PENA
101 ASH STREET, HQ-13D
SAN DIEGO, CA 92101
cfpena@sempra.com

ATTORNEY AT LAW JONATHAN D. PENDLETON
77 BEALE STREET
SAN FRANCISCO, CA 94105
j1pc@pge.com

ROBERT L. PETTINATO
PO BOX 51111, RM. 1148
LOS ANGELES, CA 90051-0100
robert.pettinato@ladwp.com

Wendy M Phelps
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
wmp@cpuc.ca.gov

SENIOR ASSOC. ENERGY AND INFRASTRUCTURE SUSANNE PHINNEY, D.ENV.
8801 FOLSOM BLVD., SUITE 290
SACRAMENTO, CA 95826-3250
Sphinney@aspeneg.com

PRINCIPAL GORDON PICKERING
3100 ZINFANDEL DRIVE, SUITE 600
RANCHO CORDOVA, CA 95670-6078
gpickering@navigantconsulting.com

MARK PINNEY
2100 - 350 SEVENTH AVENUE, S.W.
CALGARY, AB T2P 3N9
pinney@capp.ca

Robert M. Pocta
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
rmp@cpuc.ca.gov

GREGORY R. POHL
PO BOX 4060
MODESTO, CA 95352-4060
gregp@mid.com

ATTORNEY AT LAW EDWARD G. POOLE
601 CALIFORNIA STREET, SUITE 1300
SAN FRANCISCO, CA 94108-2818
epoole@adplaw.com

ATTORNEY AT LAW DOUGLAS PORTER
2244 WALNUT GROVE AVENUE
ROSEMEAD, CA 91770
douglas porter@sce.com

Brian C Prusnek
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
bcp@cpuc.ca.gov

SEMPRA ENERGY UTILITIES STEVE RAHON
8315 CENTURY PARK COURT
SAN DIEGO, CA 92123
srahon@semprautilities.com

ROBERT W. RAMAGE JR.
PO BOX 627
CENTERPORT, NY 11721-0627
ramage@pwlng.com

Ramesh Ramchandani
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
rxr@cpuc.ca.gov

Manuel Ramirez
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
mzr@cpuc.ca.gov

SENIOR CONSULTANT EDWARD RANDOLPH
STATE CAPITOL
SACRAMENTO, CA 95814
edward.randolph@asm.ca.gov

ATTORNEY AT LAW DOUGLAS W. RASCH
800 BELL STREET, RM. 3497-O
HOUSTON, TX 77002
douglas.w.rasch@exxonmobil.com

CHIEF OPERATING OFFICER CATHY REHEIS-BOYD
1415 L STREET, SUITE 600
SACRAMENTO, CA 95814
creheis@wspa.org

EDWARD C. REMEDIOS
33 TOLEDO WAY
SAN FRANCISCO, CA 94123-2108
ecrem@ix.netcom.com

MICHAEL ROCHMAN
1430 WILLOW PASS ROAD, SUITE 240
CONCORD, CA 94520
service@spurr.org

DIRECTOR, RATES&REGULATORY AFFAIRS JOHN A ROSCHER
1400 S.W. FIFTH AVE., SUITE 900
PORTLAND, OR 97201
john_roscher@transcanada.com

THUMS JAMES ROSS
500 CHESTERFIELD CENTER, SUITE 320
CHESTERFIELD, MO 63017
jimross@r-c-s-inc.com

ATTORNEY AT LAW PATRICK ROSVALL
201 CALIFORNIA STREET, 17TH FLOOR
SAN FRANCISCO, CA 94111
smalllecs@cwclaw.com

ATTORNEY AT LAW KEITH T. SAMPSON
77 BEALE STREET (PO BOX 7442)
SAN FRANCISCO, CA 94105
kts1@pge.com

SENIOR CONSULANT DAVID A. SCHLISSEL
22 PEARL STREET
CAMBRIDGE, MA 2139
DSchlissel@synapse-energy.com

MONICA A. SCHWEBS
1516 9TH STREET, MS 14
SACRAMENTO, CA 95814
Mschwebs@energy.state.ca.us

DEPUTY COUNTY COUNSEL CHARLES SCOLASTICO
385 NORTH ARROWHEAR AVE., 4TH FLOOR
SAN BERNARDINO, CA 92415
cscolastico@cc.sbcounty.gov

LAURA J. SCOTT
2366 EASTLAKE AVENUE EAST, SUITE 322
SEATTLE, WA 98102
lscott@landsenergy.com

ATTORNEY AT LAW MICHAEL SHAMES
3100 FIFTH AVENUE, SUITE B
SAN DIEGO, CA 92103
mshames@ucan.org

KEVIN J. SIMONSEN
646 EAST THIRD AVENUE
DURANGO, CO 81301
kjsimonsen@ems-ca.com

ORNEY AT LAW AIMEE M. SMITH
101 ASH STREET
SAN DIEGO, CA 92101
amsmith@sempra.com

VICE PRESIDENT, MKTG & REG. AFFAIRS JOHN R. SMITH
2755 E. COTTONWOOD PARKWAY, STE. 300
SALT LAKE CITY, UT 84121
john.smith@kernrivergas.com

MARGARET E. SNOW
11355 WEST OLYMPIC BLVD.
LOS ANGELES, CA 90064
pucservice@manatt.com

RICHARD N. STAPLER, JR.
2755 E. COTTONWOOD PARKWAY, STE. 300
SALT LAKE CITY, UT 84121
richard.stapler@kernrivergas.com

ALANA STEELE
444 SOUTH FLOWER STREET, SUITE 1500
LOS ANGELES, CA 90071-2916
asteele@hanmor.com

ATTORNEY AT LAW NINA SUETAKE
711 VAN NESS AVE., STE 350
SAN FRANCISCO, CA 94102
nsuetake@turn.org

KAREN TERRANOVA
120 MONTGOMERY STREET, STE 2200
SAN FRANCISCO, CA 94104
filings@a-klaw.com

ATTORNEY AT LAW MICHAEL THORP
555 W. FIFTH STREET, SUITE 1400
LOS ANGELES, CA 90013
mthorp@sempra.com

ATTORNEY AT LAW JOHN TISDALE
200 CLARENDON STREET, 55TH FLOOR
BOSTON, MA 2117
jtisdale@arclightcapital.com

BILL TOBIN
101 ASH STREET, HQ08C
SAN DIEGO, CA 92101
wtobin@sempraglobal.com

CHARLES R. TOCA
1100 QUAIL, SUITE 217
NEWPORT BEACH, CA 92660
ctoca@utility-savings.com

WILLIAM W. TOMLINSON
2 NORTH NEVADA AVE.
COLORADO SPRINGS, CA 80903
william.tomlinson@elpaso.com

Laura J. Tudisco
VAN NESS AVENUE
FRANCISCO, CA 94102-3214
ljt@cpuc.ca.gov

ATTORNEY AT LAW ANDREW ULMER
900 FRONT STREET, SUITE 300
SAN FRANCISCO, CA 94111
andrew@simpsonpartners.com

ATTORNEY AT LAW LISA G. URICK
555 W. FIFTH ST., M.L. GT14E7
LOS ANGELES, CA 90013
lurick@sempra.com

ATTORNEY AT LAW DAVID E. VAN IDERSTINE
2244 WALNUT GROVE AVENUE, ROOM 345
ROSEMEAD, CA 91770
david.vanideristine@sce.com

JAMES WEIL
PO BOX 37
COOL, CA 95614
jweil@aglet.org

LULU WEINZIMER
695 9TH AVE. NO.2
SAN FRANCISCO, CA 94118
lisaweinzimer@sbcglobal.net

ROBERT B. WEISENMILLER
1999 HARRISON STREET, STE 1440
OAKLAND, CA 94612-3517
mrw@mrwassoc.com

Steven A. Weissman
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
saw@cpuc.ca.gov

LIZ WESTBY
1300 SW FIFTH AVENUE, STE 1750
PORTLAND, OR 97201
egw@a-klaw.com

ATTORNEY AT LAW GREGGORY L. WHEATLAND
2015 H STREET
SACRAMENTO, CA 95814
glw@eslawfirm.com

SHYLETHA A. WILLIAMS
8725 JOHN J KINGMAN RD. SUITE 4950
FORT BELVOIR, VA 22060-6222
swilliams@desc.dla.mil

John S. Wong
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
jsw@cpuc.ca.gov

KEVIN WOODRUFF
1100 K STREET, SUITE 204
SACRAMENTO, CA 95814
kdw@woodruff-expert-services.com

LINDA WRAZEN
101 ASH STREET, HQ16C
SAN DIEGO, CA 92101
lwrazen@sempraglobal.com

CATHERINE E. YAP
PO BOX 11031
OAKLAND, CA 94611
ceyap@earthlink.net

ATTORNEY AT LAW SALLE E. YOO
ONE EMBARCADERO CENTER, STE. 600
SAN FRANCISCO, CA 94111
salleyoo@dwt.com

REGULATORY ANALYST ERIC YUSSMAN
9960 CORPORATE CAMPUS DRIVE
LOUISVILLE, KY 40223
eyussman@knowledgeinenergy.com

MARZIA ZAFAR
601 VAN NESS AVENUE, SUITE 2060
SAN FRANCISCO, CA 94102
mzafar@semprautilities.com

JEANNE ZAIONTZ
501 WESTLAKE PARK BLVD, RM. 4328
HOUSTON, TX 77079
zaiontj@bp.com